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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,404	05/06/2002	Takeshi Uchida	566.41259X00	3597

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EXAMINER
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UMEZ ERONINI, LYNETTE T

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/069,404	Applicant(s) UCHIDA ET AL.	
	Examiner Lynette T. Umez-Eronini	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 May 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

This communication is in response to amendment filed March 22, 2005. Previously allowable subject matter of claim 3 was not taught by the former prior art of record. Hence a new art rejection is applied to address the limitation of the claim and a new office action is presented.

#### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, and 4-18, 19, and 22-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Levert et al. (US PG PUB 20010054706 A1).

Levert teaches a chemical composition for spin etch planarization of copper surface (Abstract). The composition comprises an etching solution, which comprises: an oxidizing reactant such as  $H_2O_2$  (same as applicants' oxidizing agent), a depassivating co-reactant such as  $H_2SO_4$ , acetic acidic, organic acids and mixtures thereof (which is the same as applicants' metal-oxide-dissolving agent), means for adjusting diffusion, which comprises an additive such as polyvinyl alcohol (same as applicants' water-

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soluble polymer) and carboxymethylcellulose (same as applicants' protective-film forming agent), (claims 1 and 2) and further comprises: EDTA (same as applicants' said protective-film forming agent is a nitrogen-containing compound),  $\text{NH}_4\text{OH}$ ,  $\text{H}_2\text{O}_2$ , in aqueous solution (claim 6 and Tables 1-10), which reads on water. Hence the above reads on,

A polishing medium for chemical mechanical polishing, comprising an oxidizing agent, a metal-oxide dissolving agent, a protective-film forming agent, a water-soluble polymer, and water, **in claims 1 and 27;**

wherein said oxidizing agent is at least one of hydrogen peroxide, nitric acid, and hypochlorous acid, **in claim 7;**

wherein said metal-oxide dissolving agent is at least one of an organic acid, **in claim 8;**

wherein said protective-film forming agent is a nitrogen-containing compound, **in claims 9 and 30-32;**

wherein said protective-film-forming agent is at least one of a mercaptan, glucose and cellulose, **in claim 10;**

a polishing method comprising polishing a polishing object film of a metal with the polishing medium for chemical mechanical polishing according to claim 1, **in claim 11;**

wherein said polishing object film comprises at least one of copper, a copper alloy, a copper oxide and a copper alloy oxide, **in claim 12;**

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wherein said water-soluble polymer is selected from the group consisting of polysaccharides, polycarboxylic acids and esters and salts thereof, and vinyl polymers, **in claims 18 and 28; and**

wherein said water-soluble polymer is selected from the group consisting of peptic acid, agar, polymalic acid, polymethacrylic acid, polyacrylic acid, polyacrylamide, polyvinyl alcohol and polyvinyl pyrrolidone, and esters and ammonium salts thereof, **in claim 19 and 29.**

Since Levert teaches examples of compounds that comprises the same chemicals as applicant's polishing medium, then using Kaisaki's polishing compounds in the same manner as the claimed invention would result wherein the polishing medium has a coefficient of kinetic friction of 0.25 or more, **in claims 4 and 13**, 0.35 or more, **in claim 22**, and 0.45 or more, **in claim 23**; an Ubbelode's viscosity of 0.95 mPa's (0.95 cP) or more and 1.5 mPa's (1.5 cP) or less, **in claims 5, 14, and 16**, of 0.96 mPa's to 1.3 mPa's, **in claim 24**, and of 0.97 to 1.0 mPa's, **in claim 25**; and a point-of-inflection pressure of 5 kPa (50 gf/cm<sup>2</sup>) or more, **in claims 6, 15, and 17** and of 10 kPa (50 gf/cm<sup>2</sup>) or more, **in claim 26.**

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 2, 3, 20, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levert (US '76 A1) as applied to claim 27 above, and further in view of Costas et al. (WO 01/14496 A1).

Levert differs in failing to teach water-soluble polymer has a weight-average molecular weight of 500 or more, 1,500 or more, and 5,000 or more, respectively in **claims 2, 20, and 21**; and water-soluble polymer comprising two or more polymers each having a weight-average molecular weight of 500 or more, wherein but a weight-average molecular weight of said polymers are different from each other.

Costas teaches a polishing composition that comprises polyacrylic acid that has a number of average molecular weight or about 20,000 – 150,000 and 25,000 – 40,000. If a blend or mixture of two polyacrylic acid is used, a low number average molecular weight polymer of 20,000 – 100,000 is used and a high number of about 200,000, - 1, 500,000 is used (page 7, lines 1-8). Costas also teaches it is possible to use polymer of the acrylic group such as copolymers of acrylic acid, polymethacrylic acid; methacrylic

acid, polyacrylamides, and a variety of other copolymer of the above and obtain an acceptable polishing composition.

Since Costas illustrate polymers comprising weight-average molecular weight of more than 500, 1500, and 5000 or more and two or more polymers having different weight-average molecular weight is known, then it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to select any weight-average molecular weight of the polymer in the Costas reference that would effectively accomplish the disclosed composition because it has been held that there is no invention where the difference in proportions is not critical and was ascertained by routine experimentation because the determination of workable ranges is not considered inventive. See *In re Swain and Adams*, 70 USPQ 412 (CPA 1946).

### ***Response to Arguments***

6. Applicant's arguments filed 3/22/2005 have been fully considered but they are not persuasive. Applicants traverse the rejection of the claimed invention over Levert (US PG PUB 2001/0054706) and Kaisaki et al. (US 6,194,317) and argue the teachings of the applied references would neither disclosed nor would have suggested such polishing medium as in the present claims and evidence in the specification provides unexpectedly better results that are achieved by the present invention.

Applicants' arguments are unpersuasive because Levert taken alone teaches the same composition mixture (claims 1, 2, and 6 and Tables 1-10), as claimed by applicants and using Levert's composition in the same manner as in the claimed

invention would inherently result in the same polishing medium as claimed by applicants. Also, Applicants' arguments are unpersuasive because applicants have failed to compare and contrast polishing performance of Levert's composition when used under the same conditions as shown in the Examples and Comparative Examples in the tables of the Specification of the claimed invention.

Applicants' arguments with respect to Kaisaki failure to teach a polishing medium comprising a water-soluble polymer along with the other limitations of the claimed invention were persuasive and the rejection has been withdrawn.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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June 23, 2005

**NADINE G. NORTON**  
**SUPERVISORY PATENT EXAMINER**

A handwritten signature in black ink, appearing to read 'Norton', written in a cursive style.